

WHAT IS CLAIMED:

Fig 21

1. An isolated DNA molecule encoding a protein or polypeptide from *Xanthomonas campestris* which elicits a hypersensitive response in non-host plants and has a molecular weight of about 13-15 kDa as measured by SDS-PAGE.
2. The isolated DNA molecule according to claim 1, wherein the isolated DNA molecule is selected from the group consisting of (a) a DNA molecule encoding a protein comprising an amino acid sequence of SEQ. ID. No. 2, (b) a DNA molecule which hybridizes to a DNA molecule complementary to a nucleotide sequence comprising SEQ. ID. No. 1 in a hybridization medium comprising 2X SSC, 0.1% SDS at 56°C, and (c) a DNA molecule complementary to DNA molecules (a) or (b).
3. The isolated DNA molecule according to claim 2, wherein said DNA molecule is a DNA molecule encoding a protein comprising an amino acid of SEQ. ID. No. 2.
4. The isolated DNA molecule according to claim 3, wherein said DNA molecule is a DNA molecule comprising a nucleotide sequence of SEQ. ID. No. 1.
5. The isolated DNA molecule according to claim 2, wherein said DNA molecule is a DNA molecule complementary to a nucleotide sequence comprising SEQ. ID. No. 1 in a hybridization medium comprising 2X SSC, 0.1% SDS at 56°C.
6. The isolated DNA molecule according to claim 2, wherein said DNA molecule is a DNA molecule complementary to DNA molecules (a) or (b).
7. An expression vector transformed with the DNA molecule of claim 1.

Sub 93

8. The expression vector according to claim 7, wherein the DNA molecule is in sense orientation and correct reading frame.

9. A host cell transformed with the DNA molecule of claim 1.

10. The host cell according to claim 9, wherein the host cell is selected from the group consisting of a plant cell and a bacterial cell.

Sub 94

11. The host cell according to claim 9, wherein the DNA molecule is transformed with an expression vector.

12. A transgenic plant transformed with the DNA molecule of claim 1.

Sub 95

13. The transgenic plant according to claim 12, wherein the plant is selected from the group consisting of alfalfa, rice, wheat, barley, rye, cotton, sunflower, peanut, corn, potato, sweet potato, bean, pea, chicory, lettuce, endive, cabbage, brussel sprout, beet, parsnip, turnip, cauliflower, broccoli, turnip, radish, spinach, onion, garlic, eggplant, pepper, celery, carrot, squash, pumpkin, zucchini, cucumber, apple, pear, melon, citrus, strawberry, grape, raspberry, pineapple, soybean, tobacco, tomato, sorghum, and sugarcane.

14. The transgenic plant according to claim 12, wherein the plant is selected from the group consisting of *Arabidopsis thaliana*, *Saintpaulia*, petunia, pelargonium, poinsettia, chrysanthemum, carnation, rose, tulip, and zinnia.

15. A transgenic plant seed transformed with the DNA molecule of claim 1.

Sub 96

16. The transgenic plant seed according to claim 15, wherein the plant seed is selected from the group consisting of seeds from alfalfa, rice, wheat, barley, rye, cotton, sunflower, peanut, corn, potato, sweet potato, bean, pea, chicory, lettuce, endive, cabbage, brussel sprout, beet, parsnip, turnip, cauliflower, broccoli,

turnip, radish, spinach, onion, garlic, eggplant, pepper, celery, carrot, squash, pumpkin, zucchini, cucumber, apple, pear, melon, citrus, strawberry, grape, raspberry, pineapple, soybean, tobacco, tomato, sorghum, and sugarcane.

17. The transgenic plant seed according to claim 15, wherein the plant seed is selected from the group consisting of seeds from *Arabidopsis thaliana*, *Saintpaulia*, petunia, pelargonium, poinsettia, chrysanthemum, carnation, rose, tulip, and zinnia

Sub 24

18. A cutting which has been removed from a transgenic plant according to claim 12, which transgenic plant is an ornamental plant, wherein the cutting is characterized by greater resistance to desiccation as compared to a cutting removed from a non-transgenic ornamental plant.

19. An isolated protein or polypeptide of *Xanthomonas campestris* which is capable of eliciting a hypersensitive response in non-host plants and has a molecular weight of about 13-15 kDa as measured by SDS-PAGE.

20. The isolated protein or polypeptide according to claim 19, wherein the protein or polypeptide comprises an amino acid sequence of SEQ. ID. No. 2.

21. The isolated protein or polypeptide according to claim 19, wherein the protein or polypeptide is glycine rich and substantially lacks cysteine.

22. The isolated protein or polypeptide according to claim 21, wherein the protein or polypeptide comprises not more than 1 cysteine residue.

23. A method of imparting disease resistance to plants comprising: applying a hypersensitive response elicitor protein or polypeptide according to claim 19 to a plant or plant seed under conditions effective to impart disease resistance to the plant or a plant grown from the plant seed.

24. The method according to claim 23, wherein said applying comprises applying the hypersensitive response elicitor protein or polypeptide to plants.

25. The method according to claim 23, wherein said applying comprises applying the hypersensitive response elicitor protein or polypeptide to plant seeds, said method further comprising:

planting the seeds treated with the hypersensitive response elicitor in natural or artificial soil and  
propagating plants from the seeds planted in the soil.

26. A method of enhancing plant growth comprising:  
applying a hypersensitive response elicitor protein or polypeptide according to claim 19 to a plant or plant seed under conditions effective to enhance growth of the plant or a plant grown from the plant seed.

27. The method according to claim 26, wherein said applying comprises applying the hypersensitive response elicitor protein or polypeptide to plants.

28. The method according to claim 26, wherein said applying comprises applying the hypersensitive response elicitor protein or polypeptide to plant seeds, said method further comprising:

planting the seeds treated with the hypersensitive response elicitor in natural or artificial soil and  
propagating plants from the seeds planted in the soil.

29. A method of insect control for plants comprising:  
applying a hypersensitive response elicitor protein or polypeptide according to claim 19 to a plant or plant seed under conditions effective to control insects on the plant or a plant grown from the plant seed.

30. The method according to claim 29, wherein said applying comprises applying the hypersensitive response elicitor protein or polypeptide to plants.

31. The method according to claim 29, wherein said applying comprises applying the hypersensitive response elicitor protein or polypeptide to plant seeds, said method further comprising:

planting the seeds treated with the hypersensitive response elicitor in natural or artificial soil and  
propagating plants from the seeds planted in the soil.

32. A method of imparting stress resistance to plants comprising:  
applying a hypersensitive response elicitor protein or polypeptide according to claim 19 to a plant or plant seed under conditions effective to impart stress resistance to the plant or a plant grown from the plant seed.

33. The method according to claim 32, wherein said applying comprises applying the hypersensitive response elicitor protein or polypeptide to plants.

34. The method according to claim 32, wherein said applying comprises applying the hypersensitive response elicitor protein or polypeptide to plant seeds, said method further comprising:

planting the seeds treated with the hypersensitive response elicitor in natural or artificial soil and  
propagating plants from the seeds planted in the soil.

35. A method of inhibiting post-harvest disease or desiccation of a fruit or vegetable, said method comprising:

treating a fruit or vegetable with a hypersensitive response elicitor protein or polypeptide according to claim 19 under conditions effective to inhibit post-harvest disease or desiccation of the fruit or vegetable.

36. The method according to claim 35, wherein said treating comprises applying the protein or polypeptide to a plant which produces the fruit or vegetable.

37. The method according to claim 35, further comprising:  
harvesting the fruit or vegetable, wherein said treating is performed after said harvesting.

38. A method of inhibiting desiccation of cuttings from ornamental plants comprising:

treating an ornamental plant with a hypersensitive response elicitor protein or polypeptide according to claim 19 under conditions effective to inhibit desiccation of a cutting from the ornamental plant after the cutting is removed from the ornamental plant.

39. *A* The method according to claim 38, wherein said treating comprises applying the protein or polypeptide to the ornamental plant.

40. The method according to claim 38 further comprising:  
removing a cutting from the treated ornamental plant and  
applying the protein or polypeptide to the removed cutting.

41. A method of promoting early flowering of an ornamental plant comprising:  
applying a hypersensitive response elicitor protein or polypeptide according to claim 19 to an ornamental plant under conditions effective to promote early flowering of the ornamental plant.

42. A method of harvesting a cutting from an ornamental plant comprising:

treating an ornamental plant with a hypersensitive response elicitor protein or polypeptide according to claim 19 and  
harvesting a cutting from the treated ornamental plant.

43. The method according to claim 42, wherein said treating comprises topically applying the protein or polypeptide to the ornamental plant.

44. The method according to claim 42 further comprising:  
applying the protein or polypeptide to the harvested cutting.

45. A method of harvesting a cutting from an ornamental plant comprising:  
harvesting a cutting from an ornamental plant and  
treating the harvested cutting with a hypersensitive response elicitor protein or polypeptide according to claim 19.

46. The method according to claim 45, wherein said treating comprises topically applying the protein or polypeptide to the harvested cutting.

47. A method of inhibiting desiccation of cuttings from ornamental plants comprising:  
removing a cutting from an ornamental plant and  
treating the removed cutting with a hypersensitive response elicitor protein or polypeptide according to claim 19 under conditions effective to inhibit desiccation of the removed cutting.

48. The method according to claim 47, wherein said treating comprises topically applying the protein or polypeptide to the harvested cutting.

49. A cutting which has been removed from an ornamental plant, wherein the cutting has been treated with a hypersensitive response elicitor protein or polypeptide according to claim 19 and wherein the cutting is characterized by greater resistance to desiccation as compared to an untreated cutting removed from the ornamental plant.

50. A cutting which has been removed from an ornamental plant treated with a hypersensitive response elicitor protein or polypeptide according to claim 19, wherein the cutting is characterized by greater resistance to desiccation as compared to a cutting removed from an untreated ornamental plant.


51. A method of imparting disease resistance to plants comprising:  
providing a transgenic plant or plant seed transformed with a DNA molecule according to claim 1 and  
growing the transgenic plant or transgenic plant produced from the transgenic plant seed under conditions effective to impart disease resistance.

52. The method according to claim 51, wherein a transgenic plant is provided.

53. The method according to claim 51, wherein a transgenic plant seed is provided.

54. A method of enhancing plant growth comprising:  
providing a transgenic plant or plant seed transformed with a DNA molecule according to claim 1 and  
growing the transgenic plant or transgenic plant produced from the transgenic plant seed under conditions effective to enhance plant growth.

55. The method according to claim 54, wherein a transgenic plant is provided.

56. The method according to claim 54, wherein a transgenic plant seed is provided.
57. A method of insect control for plants comprising:  
providing a transgenic plant or plant seed transformed with a DNA molecule according to claim 1 and  
growing the transgenic plant or transgenic plant produced from the transgenic plant seed under conditions effective to control insects.
58. The method according to claim 57, wherein a transgenic plant is provided.
59. The method according to claim 57, wherein a transgenic plant seed is provided.
60.  A method of imparting stress resistance to plants comprising:  
providing a transgenic plant or transgenic plant seed transformed with a DNA molecule according to claim 1 and  
growing the transgenic plant or transgenic plant produced from the transgenic plant seed under conditions effective to impart stress resistance.
61. The method according to claim 60, wherein a transgenic plant is provided.
62. The method according to claim 60, wherein a transgenic plant seed is provided.

63. A method of inhibiting post-harvest disease or desiccation in a fruit or vegetable, said method comprising:

providing a transgenic plant or plant seed transformed with a DNA molecule according to claim 1 and

growing the transgenic plant or transgenic plant produced from the transgenic plant seed under conditions effective to inhibit post-harvest disease or desiccation of the fruit or vegetable.

64. The method according to claim 63, wherein a transgenic plant is provided.

65. The method according to claim 63, wherein a transgenic plant seed is provided.

66. A method of inhibiting desiccation of cuttings from ornamental plants comprising:

providing a transgenic ornamental plant or plant seed transformed with a DNA molecule according to claim 1 and

growing the transgenic ornamental plant or transgenic ornamental plant produced from the transgenic ornamental plant seed under conditions effective to inhibit desiccation of a cutting removed from the transgenic plant.

67. The method of claim 66 further comprising:  
removing a cutting from the transgenic ornamental plant and  
applying a hypersensitive response elicitor protein or polypeptide to the removed cutting.

68. The method of claim 66, wherein the hypersensitive response elicitor protein or polypeptide is expressed in tissues of the cutting.

69. A method of promoting early flowering of an ornamental plant comprising:

providing a transgenic ornamental plant or plant seed transformed with a DNA molecule according to claim 1 and  
growing the transgenic ornamental plant or transgenic ornamental plant produced from the transgenic ornamental plant seed under conditions effective to promote early flowering of the transgenic ornamental plant.

70. The method of claim 69, wherein the hypersensitive response elicitor protein or polypeptide is expressed in flower tissues.

71. A method of harvesting a cutting from an ornamental plant comprising:

providing a transgenic ornamental plant or plant seed transformed with a DNA molecule according to claim 1;  
growing the transgenic ornamental plant or transgenic ornamental plant produced from the transgenic ornamental plant seed; and  
harvesting a cutting from the grown transgenic ornamental plant, wherein the cutting exhibits a reduced susceptibility to desiccation as compared to cuttings removed from non-transgenic ornamental plants.

72. The method of claim 71 further comprising:  
applying a hypersensitive response elicitor protein or polypeptide to the harvested cutting.

73. The method of claim 71, wherein the hypersensitive response elicitor protein or polypeptide is expressed in tissues of the cutting.

74. A method comprising:  
providing a plant or plant seed comprising a transgene conferring a transgenic trait to the plant or a plant grown from the plant seed, and  
applying to the plant or plant seed a hypersensitive response elicitor protein or polypeptide according to claim 19.

75. The method according to claim 74, wherein said applying is carried out under conditions effective to impart enhanced growth, stress tolerance, disease resistance, or insect resistance to the plant or the plant grown from the plant seed, thereby maximizing the benefit of the transgenic trait to the plant or the plant grown from the plant seed.

76. The method according to claim 75, said applying is carried out on a plant.

77. The method according to claim 75, wherein said applying is carried out on a plant seed.

78. The method according to claim 74, wherein the transgenic trait is associated with a deleterious effect on growth, stress tolerance, disease resistance, or insect resistance in the transgenic plant and said applying is carried out under conditions effective to impart enhanced growth, stress tolerance, disease resistance, or insect resistance to the plant or the plant grown from the plant seed, thereby overcoming the deleterious effect.

79. The method according to claim 78, said applying is carried out on a plant.

80. The method according to claim 78, wherein said applying is carried out on a plant seed.

81. A method comprising:  
providing a plant cell;  
transforming the plant cell with (i) a first DNA molecule encoding a transcript or a protein or polypeptide which confers a trait to a plant grown from the transformed plant cell and (ii) a second DNA molecule encoding ... hypersensitive response elicitor protein or polypeptide according to claim 19, which is different than the protein or polypeptide encoded by the first DNA molecule, said transforming being carried out under conditions effective to produce a transgenic plant cell; and  
regenerating a transgenic plant from the transformed plant cell.

82. The method according to claim 81, wherein said transforming with the second DNA molecule imparts enhanced growth, stress tolerance, disease resistance, or insect resistance to the plant, thereby maximizing benefit to the plant of the trait conferred by said transforming with the first DNA molecule.

83. The method according to claim 81, wherein said transforming with the first DNA molecule is accompanied by a deleterious effect on growth, stress tolerance, disease resistance, or insect resistance and wherein said transforming with the second DNA molecule overcomes the deleterious effect.

84. A transgenic plant comprising:  
a first DNA molecule encoding a transcript or a protein or polypeptide that confers a trait and  
a second DNA molecule encoding a hypersensitive response elicitor protein or polypeptide according to claim 19, which is different than the protein or polypeptide encoded by the first DNA molecule.

85. The transgenic plant according to claim 84, wherein the trait is selected from the group consisting of disease resistance, insect resistance, enhanced growth, herbicide resistance, stress tolerance, male sterility, modified flower color, and biochemically modified plant product.

86. The transgenic plant according to claim 84, wherein the first DNA molecule encodes a protein or polypeptide selected from the group consisting of B.t. toxin, *Photographus luminescens* protein, protease inhibitors, amylase inhibitors, lectins, chitinases, endochitinase, chitinase, defensins, osmotins, crystal proteins, virus proteins, herbicide resistance proteins, mannitol dehydrogenase, PG inhibitors, ACC degradation proteins, barnase, phytase, fructans, invertase, and SAMase.

87. The transgenic plant according to claim 84, wherein the first DNA molecule encodes a transcript selected from the group consisting of antisense RNA and sense RNA.

88. The transgenic plant according to claim 84, wherein the transgenic plant is selected from the group consisting of rice, wheat, barley, rye, cotton, sunflower, peanut, corn, potato, sweet potato, bean, pea, chicory, lettuce, endive, cabbage, canola, cauliflower, broccoli, turnip, radish, spinach, onion, garlic, eggplant, pepper, celery, carrot, squash, pumpkin, zucchini, cucumber, apple, pear, melon, strawberry, cranberry, grape, raspberry, pineapple, soybean, tobacco, tomato, sorghum, and sugarcane.

89. A transgenic plant seed obtained from the transgenic plant according to claim 84.

add  
28